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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/605,234

09/17/2003

Chih-Han Chang

NTCP0004USA

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27765

7590

10/23/2006

NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION

P.O. BOX 506

MERRIFIELD, VA 22116

EXAMINER

NGUYEN, KHIEM D

ART UNIT

PAPER NUMBER

2823

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/605,234	Applicant(s) CHANG ET AL.	
	Examiner Khiem D. Nguyen	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 03 August 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 September 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |  |
|--|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>20061018</u>                             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application  |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                           |

## **DETAILED ACTION**

### ***Response to Applicants' Arguments***

1. The non-final rejection as set forth in paper No. (042405) mailed on April 27<sup>th</sup>, 2005 is withdrawn in response to applicants' arguments during the telephone interview with Mr. Scott Margo on July 26<sup>th</sup>, 2005. Claims (1-19) are pending in the application. However, upon further consideration, a new grounds(s) of rejection is made in view of Chen et al. (U.S. Patent 6,929,998).

### ***Allowable Subject Matter***

2. The indicated allowability of claims 7-12 is withdrawn in view of the newly discovered reference(s) to Chen et al. (U.S. Patent 6,929,998). Rejections based on the newly cited reference(s) follow.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

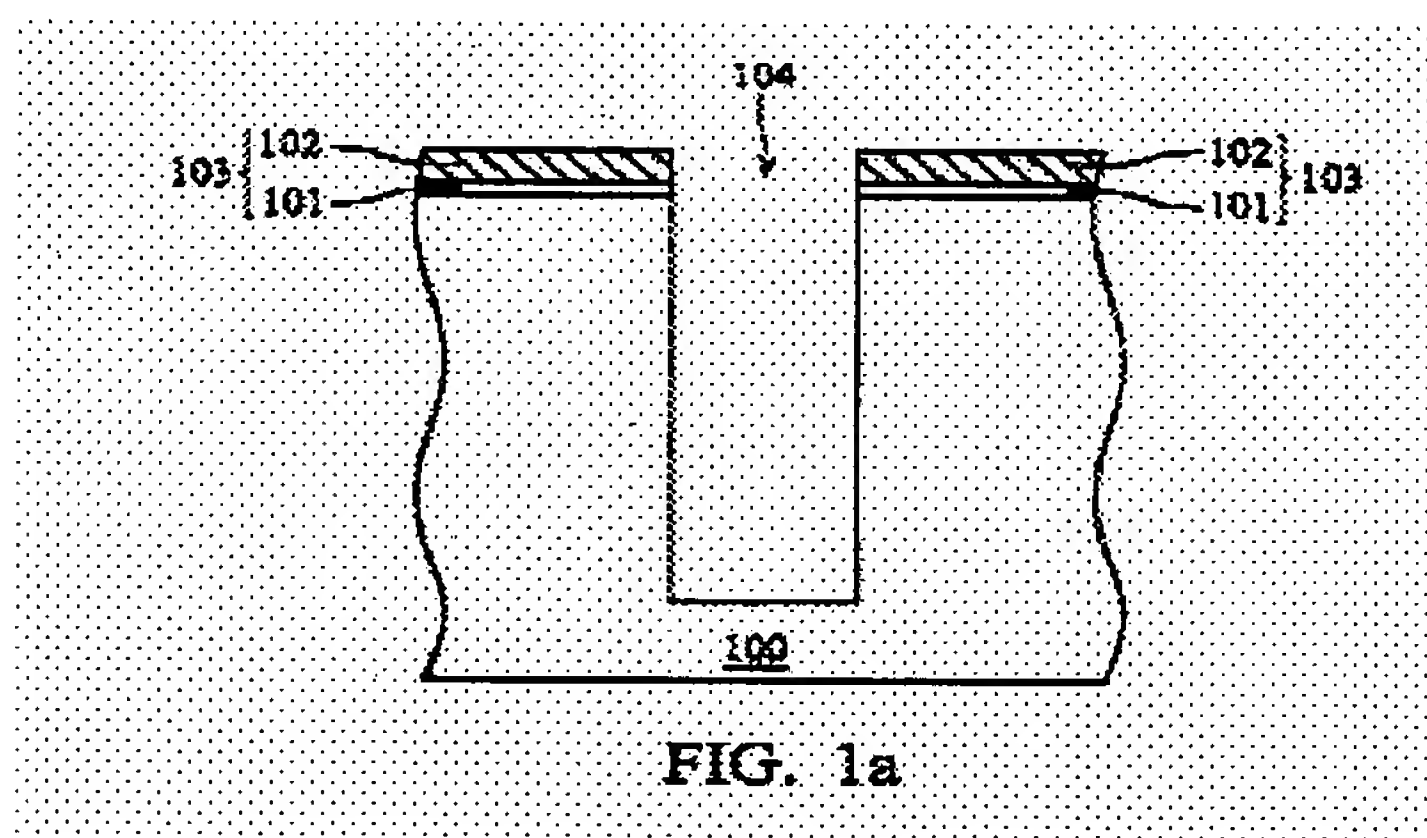
(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Chen et al. (U.S. Patent 6,929,998).

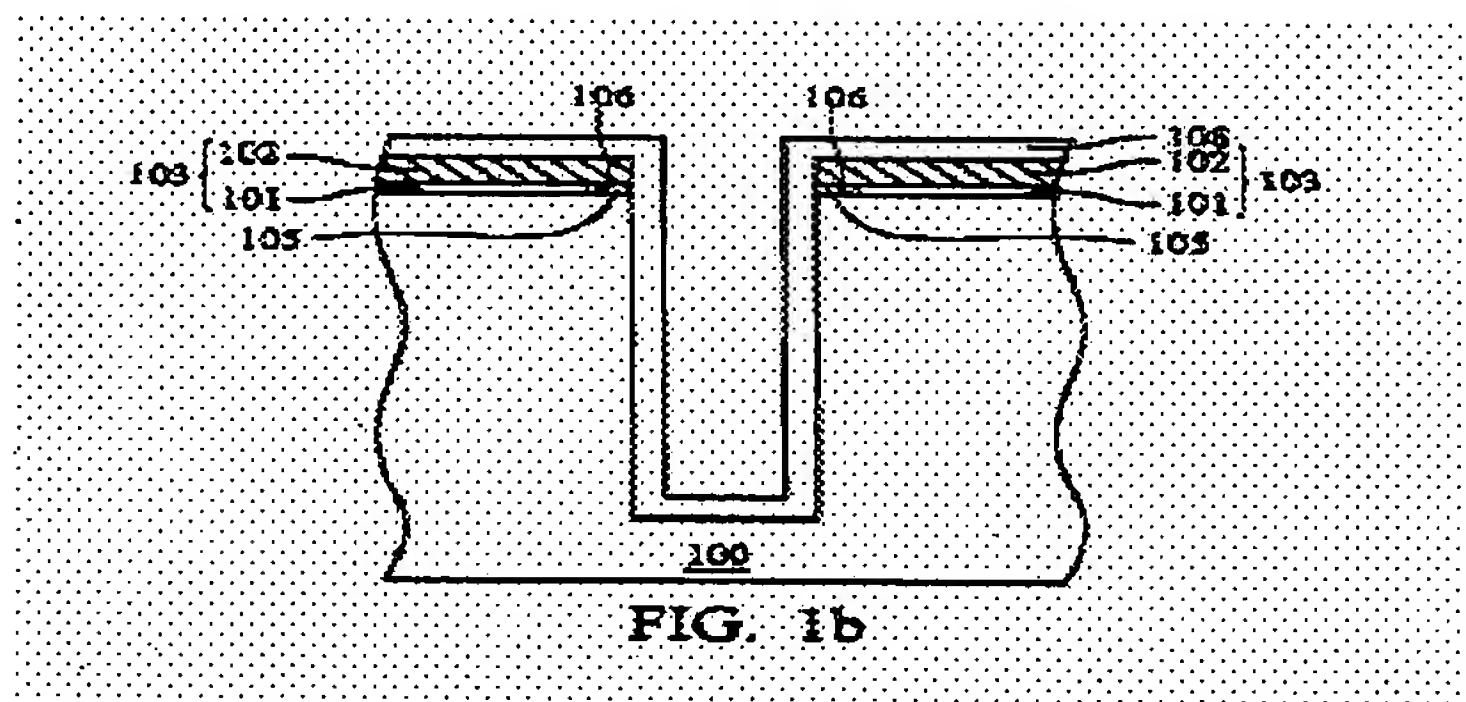
The applied reference has a common assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a

showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention “by another,” or by an appropriate showing under 37 CFR 1.131.

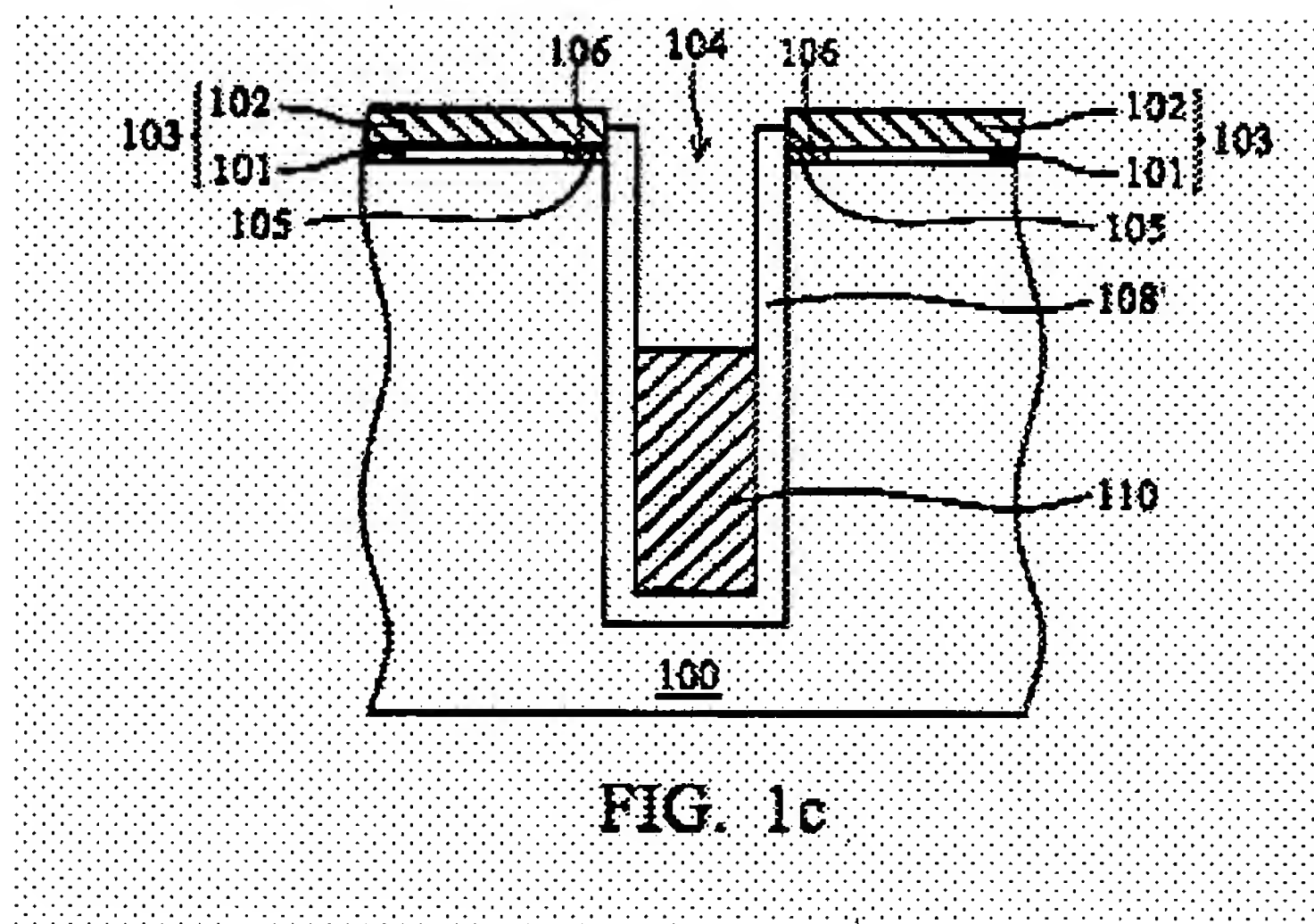
In re claim 1, **Chen** discloses a method for forming a deep trench capacitor buried plate comprising: providing a substrate **100** having a pad oxide **101** and the pad nitride layer **102** thereon, the pad oxide layer **101** and a pad nitride **102** layer having at least an opening; performing a dry etching process for forming a deep trench **104** in the substrate **100** via the opening (col. 3, lines 16-34 and FIG. 1a);



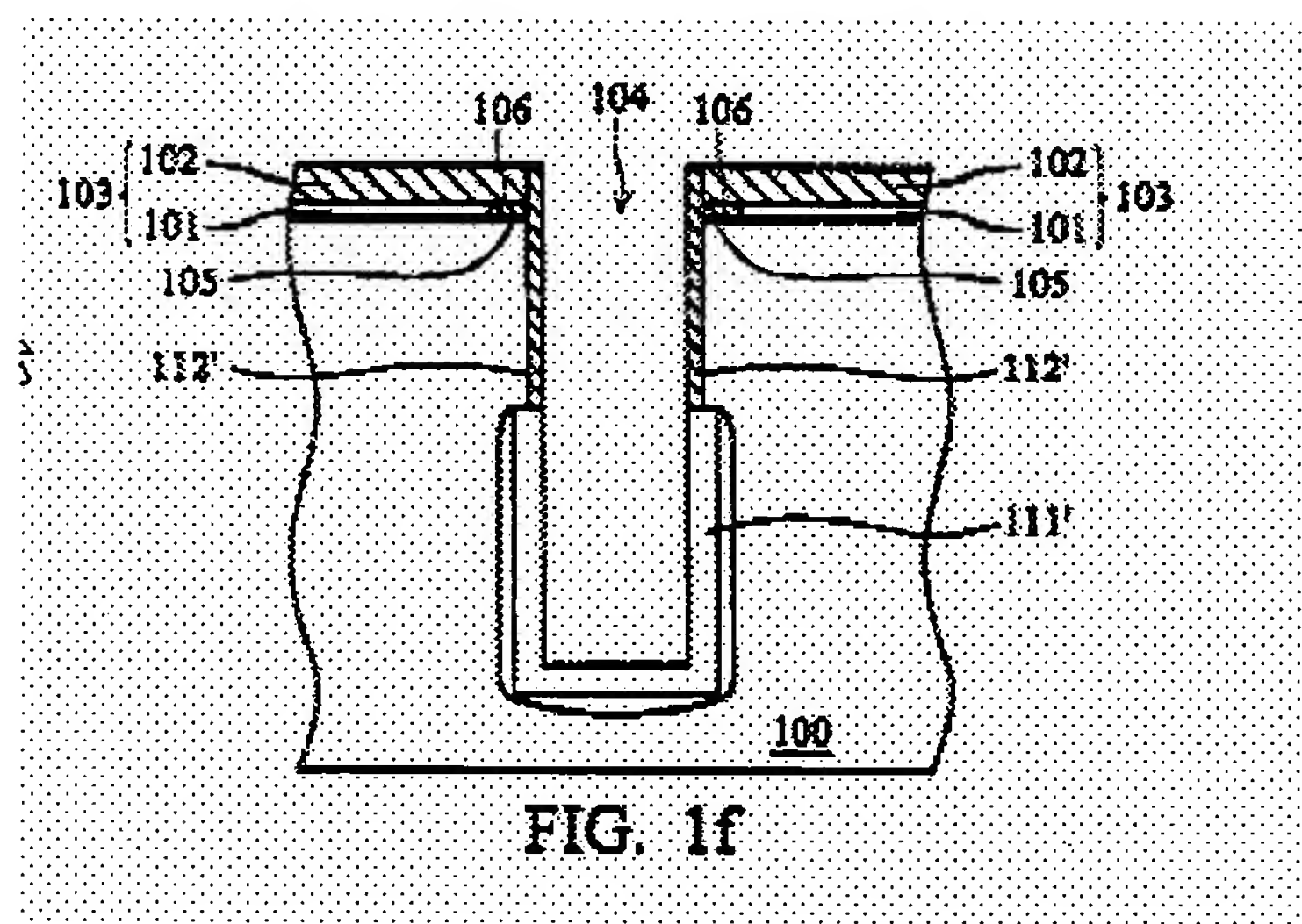
depositing a doped silicate glass film **108** on an inner wall of the deep trench **100** (col. 3, lines 35-47 and FIG. 1b);



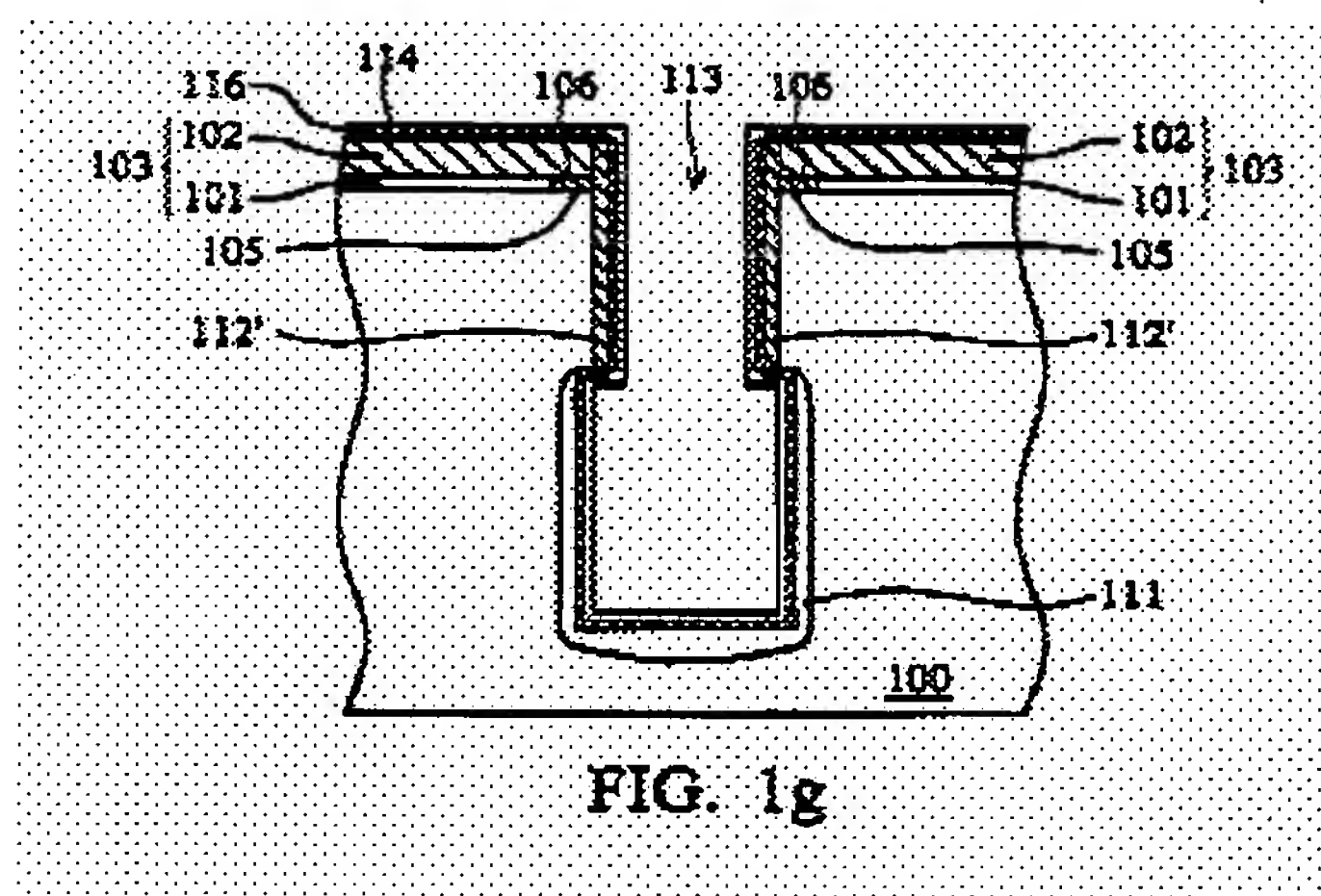
filling a sacrificial layer into the deep trench 104 (col. 3, lines 48-58); etching back the sacrificial for exposing parts of the doped silicate glass film 108 (col. 3, lines 48-58 and FIG. 1c);



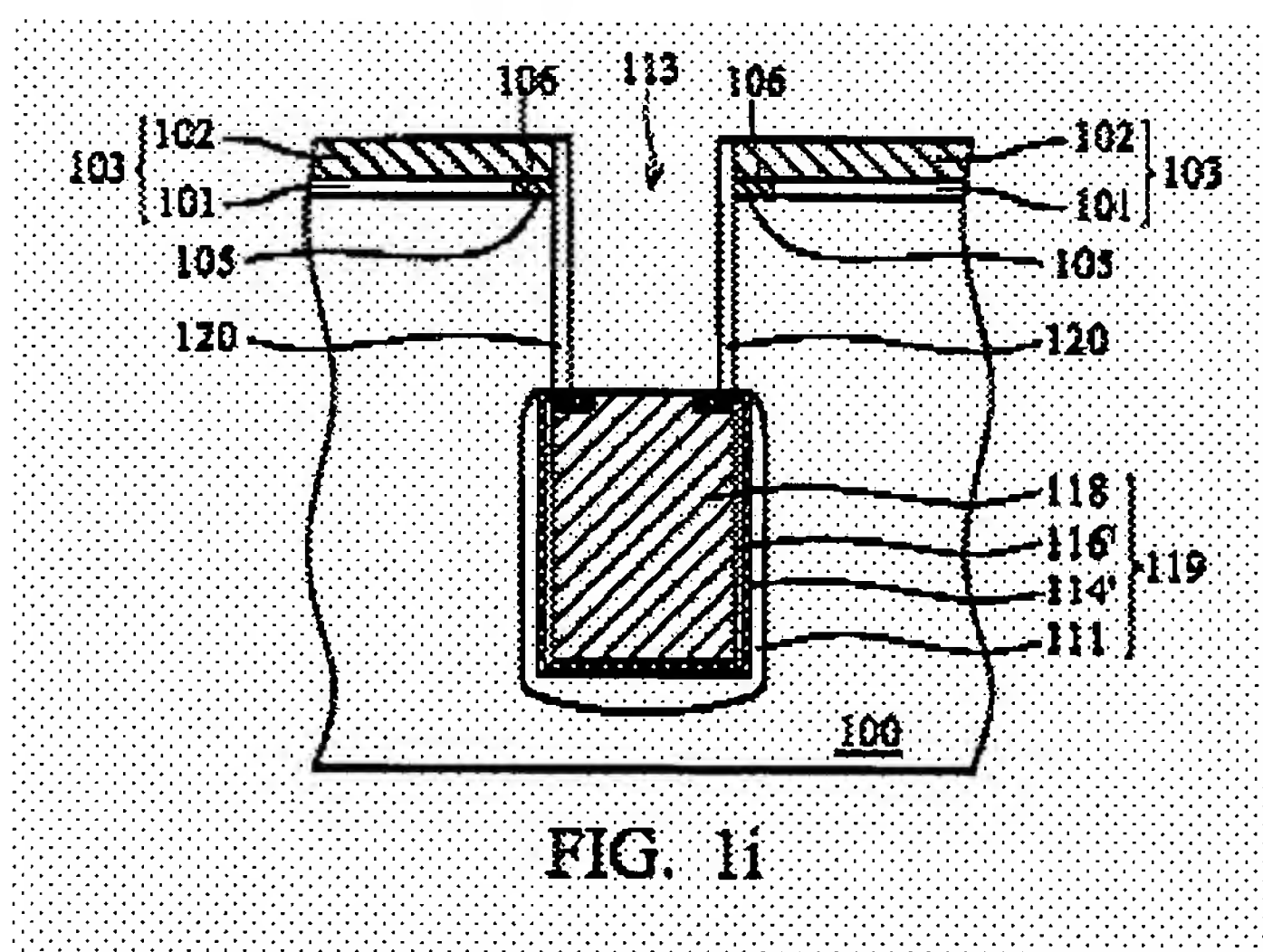
removing the exposed doped silicate glass film 108 (col. 3, lines 59-66 and FIG. 1d); removing the remaining sacrificial layer (FIG. 1f);



depositing a silicon nitride layer 112' on the inner wall of the deep trench 104  
 (col. 3, lines 66-67); performing a thermal process for forming a doped region 111 at a  
 bottom of the trench 104 (col. 4, lines 1-7 and FIG. 1g);



removing the silicon nitride layer 112' (col. 4, lines 8-14 and FIG. 1i); and  
 removing the doped silicate glass film (col. 4, lines 14-20 and FIG. 1i);



wherein the silicon nitride layer 112' serves as a barrier layer for preventing ions  
 of the doped silicate glass film 108 from diffusing into a collar region of the deep trench  
 104 (col. 4, lines 1-7 and FIG. 1g).

In re claim 2, **Chen** discloses that the doped silicate glass film **108** is an arsenic silicate glass (ASG) film (col. 3, lines 45-46).

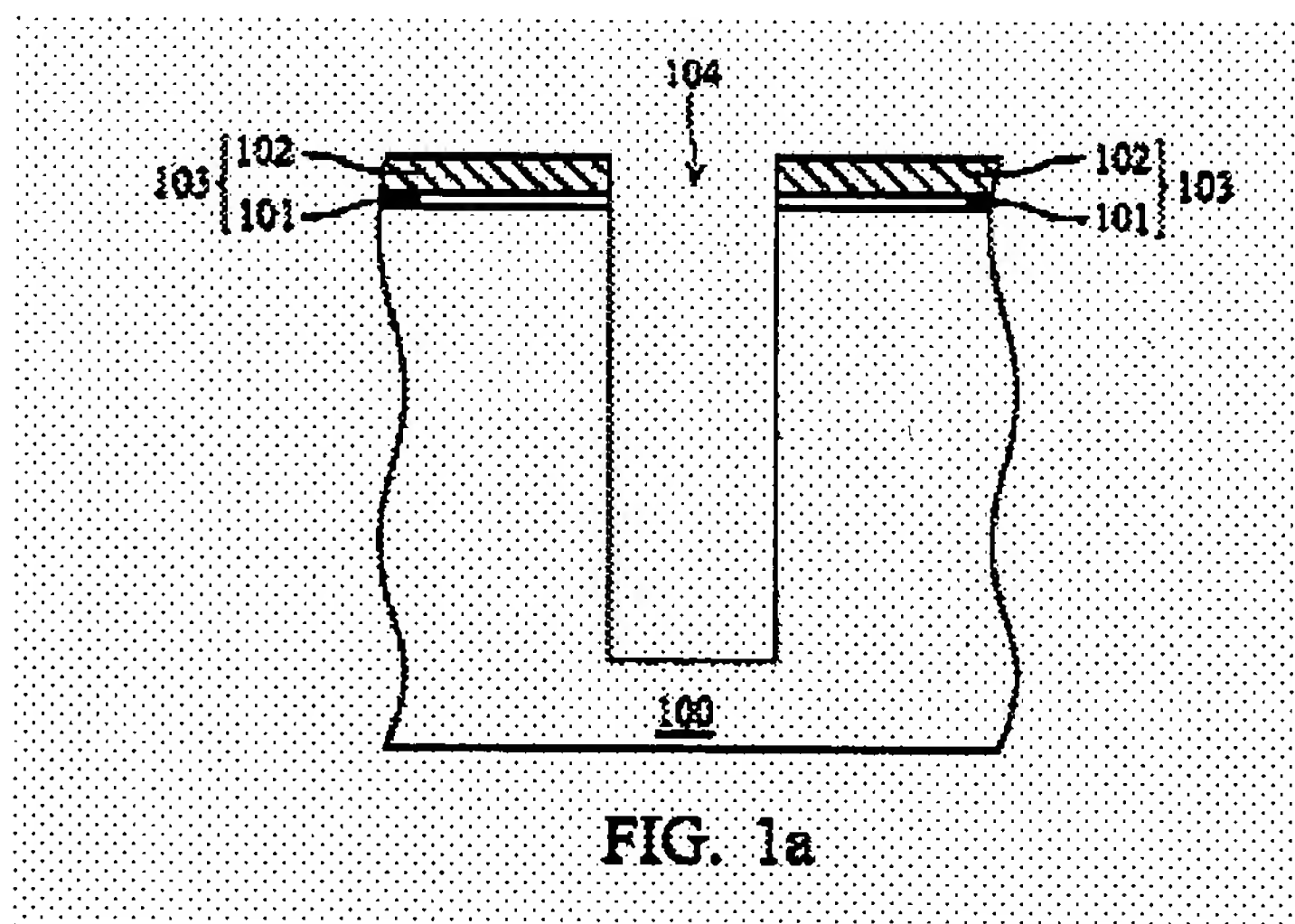
In re claim 3, **Chen** discloses that the arsenic silicate glass film **108** is formed by a chemical vapor deposition (CVD) process (col. 3, lines 42-44).

In re claim 4, **Chen** discloses that the silicon nitride layer **112'** is formed by a chemical vapor deposition process (col. 3, lines 59-66).

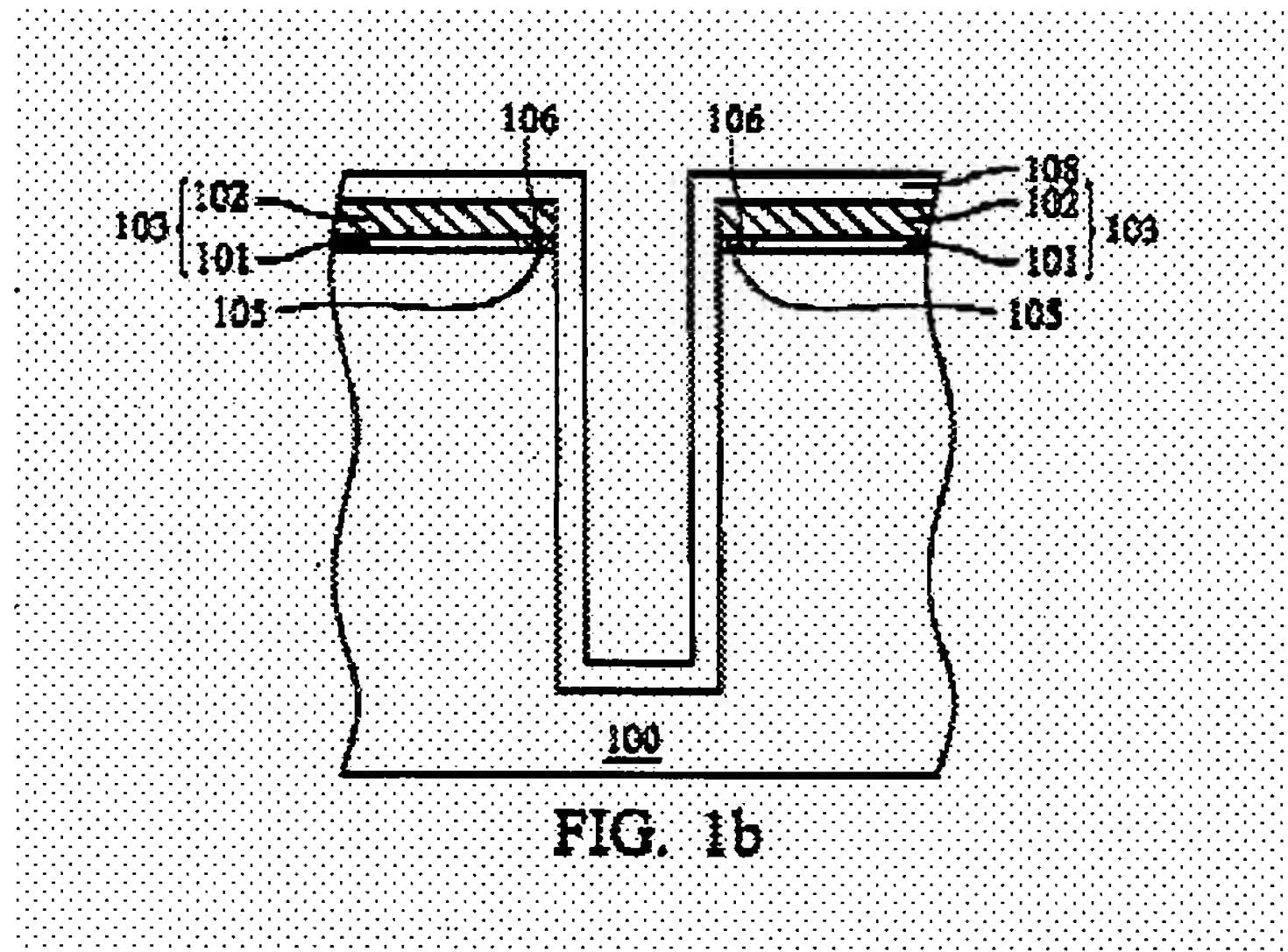
In re claim 5, **Chen** discloses that the doped silicate glass film **108** is removed by an anisotropic etching process (col. 4, lines 8-13).

In re claim 6, **Chen** discloses that the silicon nitride layer **112'** is removed by an anisotropic etching process (col. 4, lines 8-13).

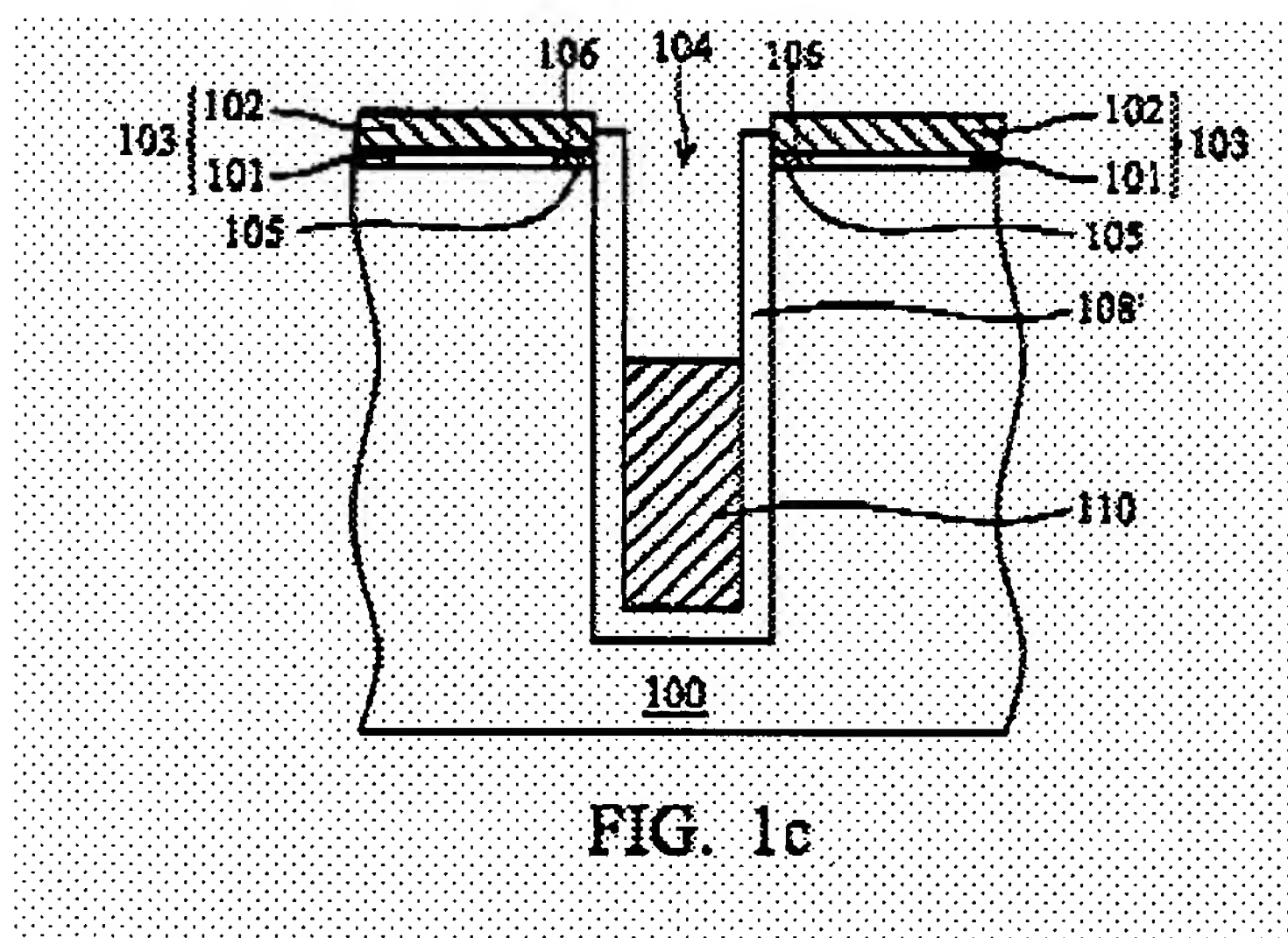
In re claim 7, **Chen** discloses a method for forming a deep trench capacitor buried plate comprising: providing a substrate **100** having a pad oxide **101** and the pad nitride layer **102** thereon, the pad oxide layer **101** and a pad nitride **102** layer having at least an opening; performing a dry etching process for forming a deep trench **104** in the substrate **100** via the opening (col. 3, lines 16-34 and FIG. 1a);



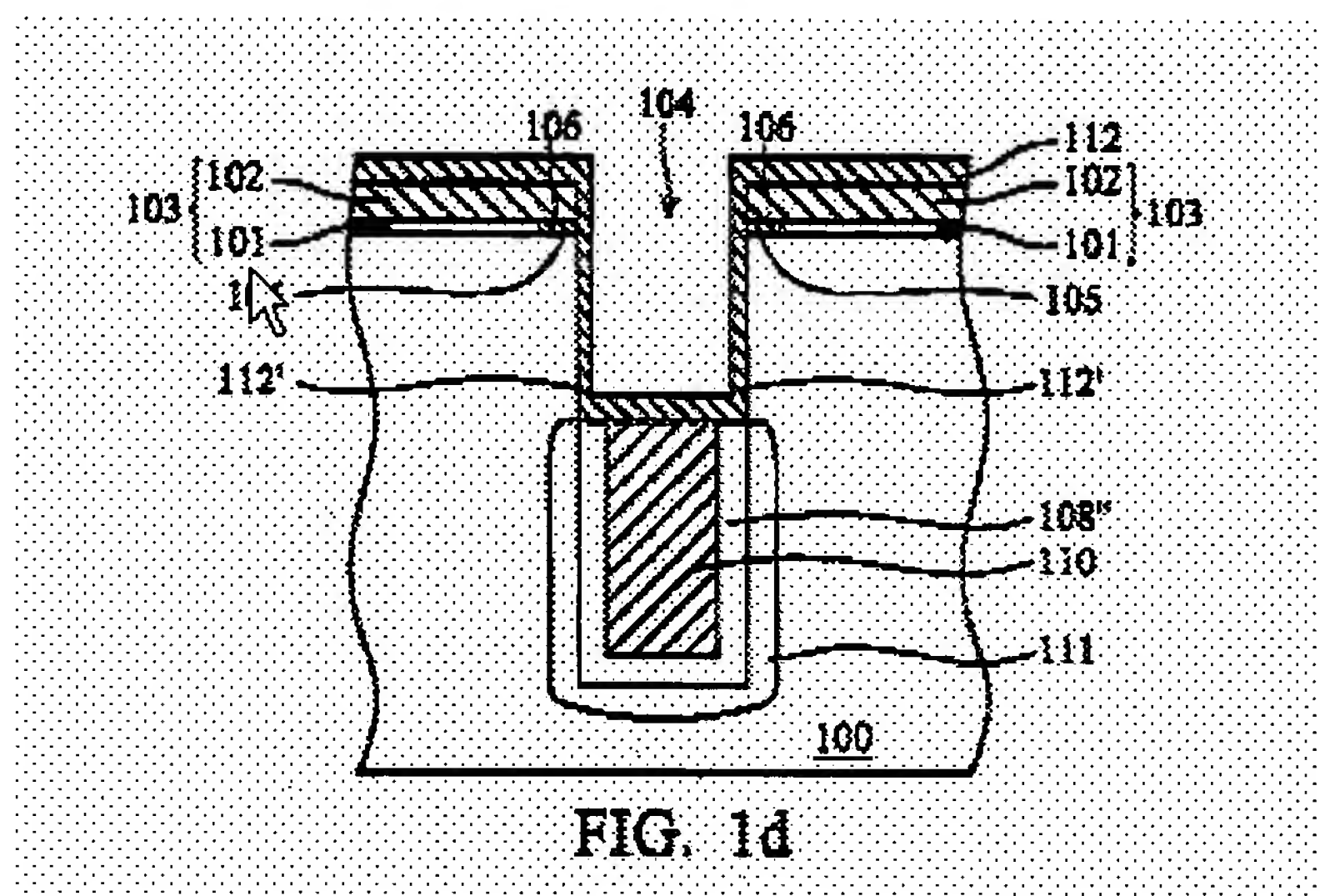
depositing a doped silicate glass film 108 on an inner wall of the deep trench 100  
(col. 3, lines 35-47 and FIG. 1b);



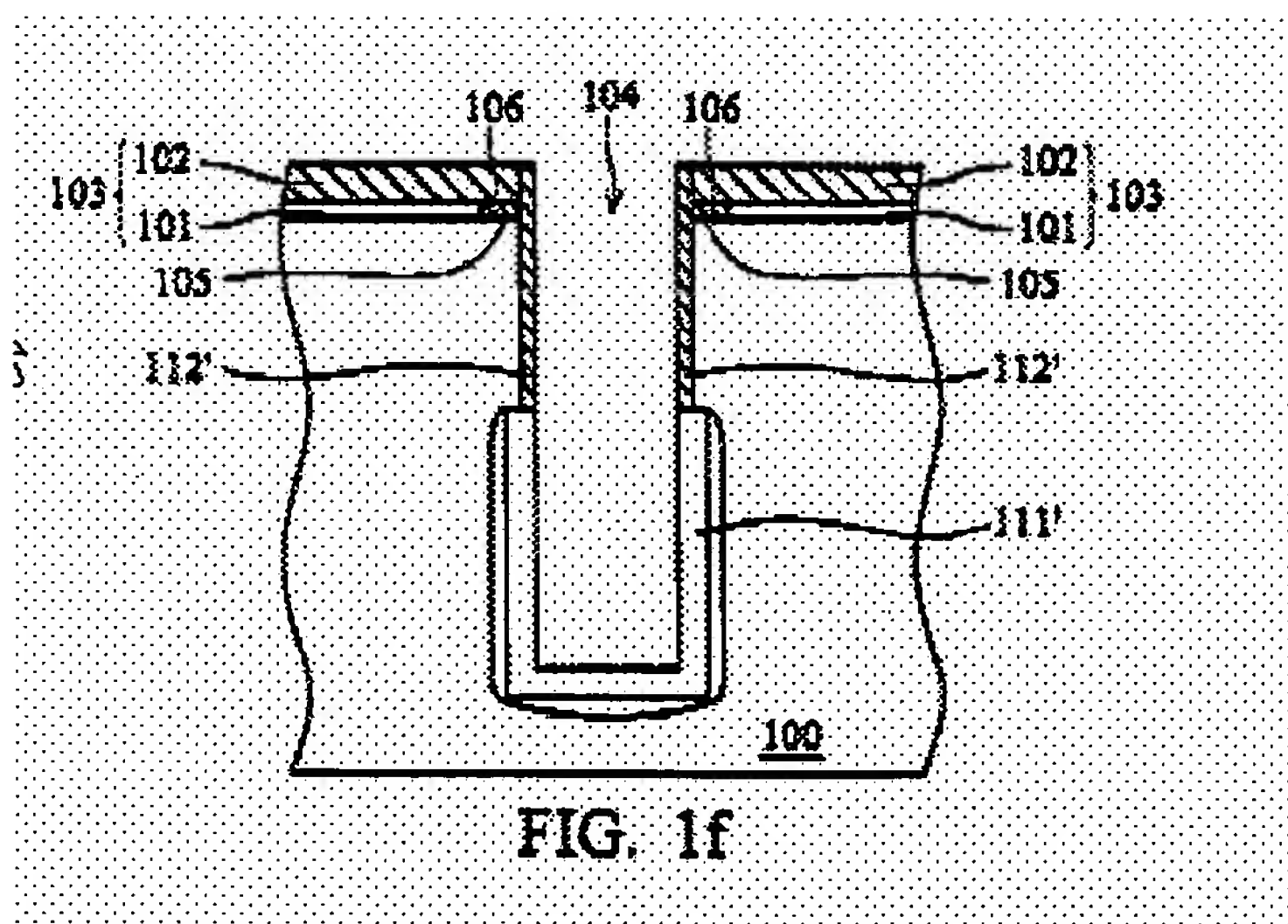
filling a sacrificial layer into the deep trench 104 (col. 3, lines 48-58); removing a portion of the sacrificial for exposing parts of the doped silicate glass film 108 (col. 3, lines 48-58 and FIG. 1c);



performing an etching process to remove the exposed doped silicate glass film 108 and a portion of the pad oxide layer 101 for forming a recess 105 (col. 3, lines 59-66 and FIG. 1d);

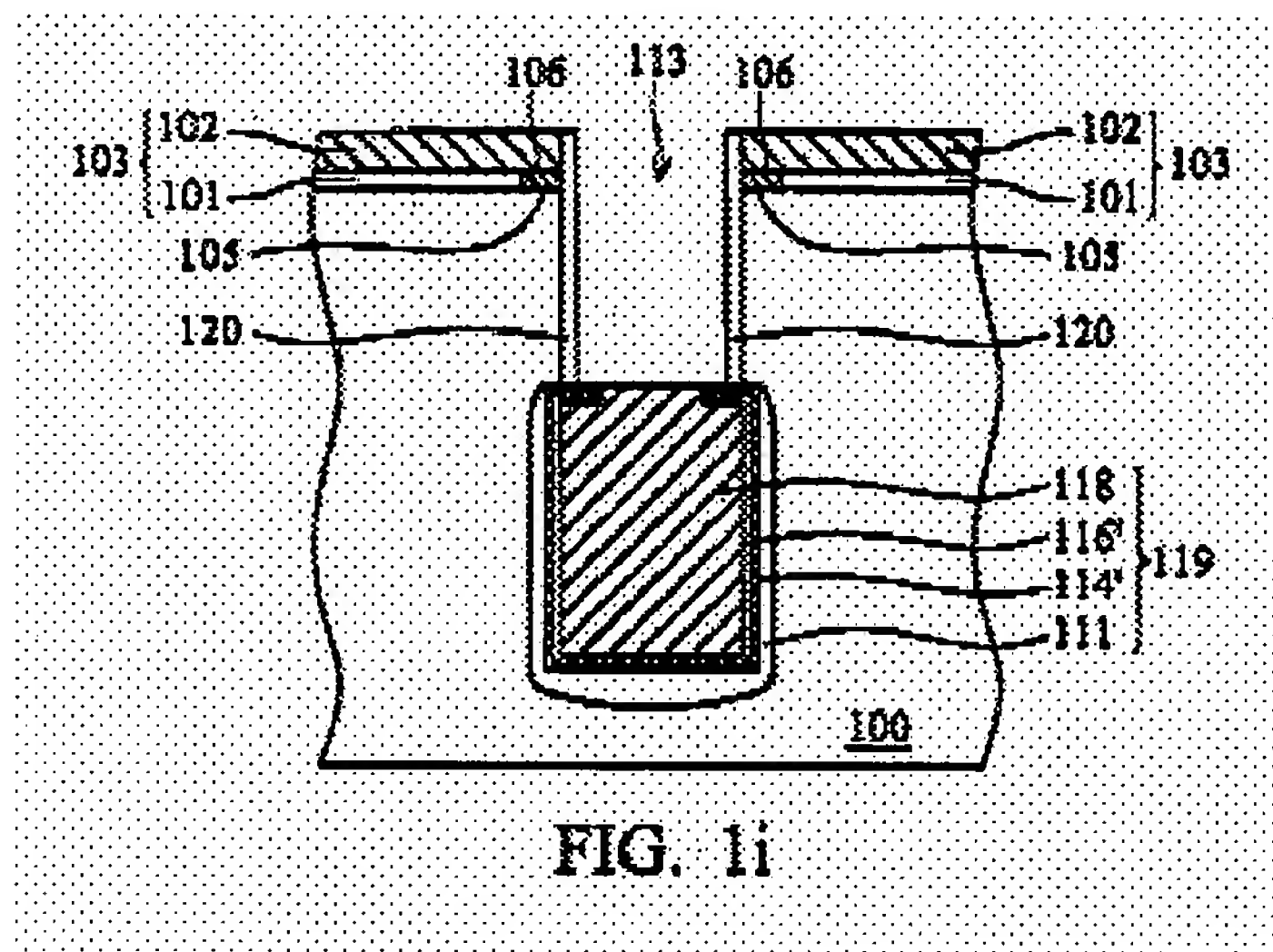


removing the remaining sacrificial layer (FIG. 1f);

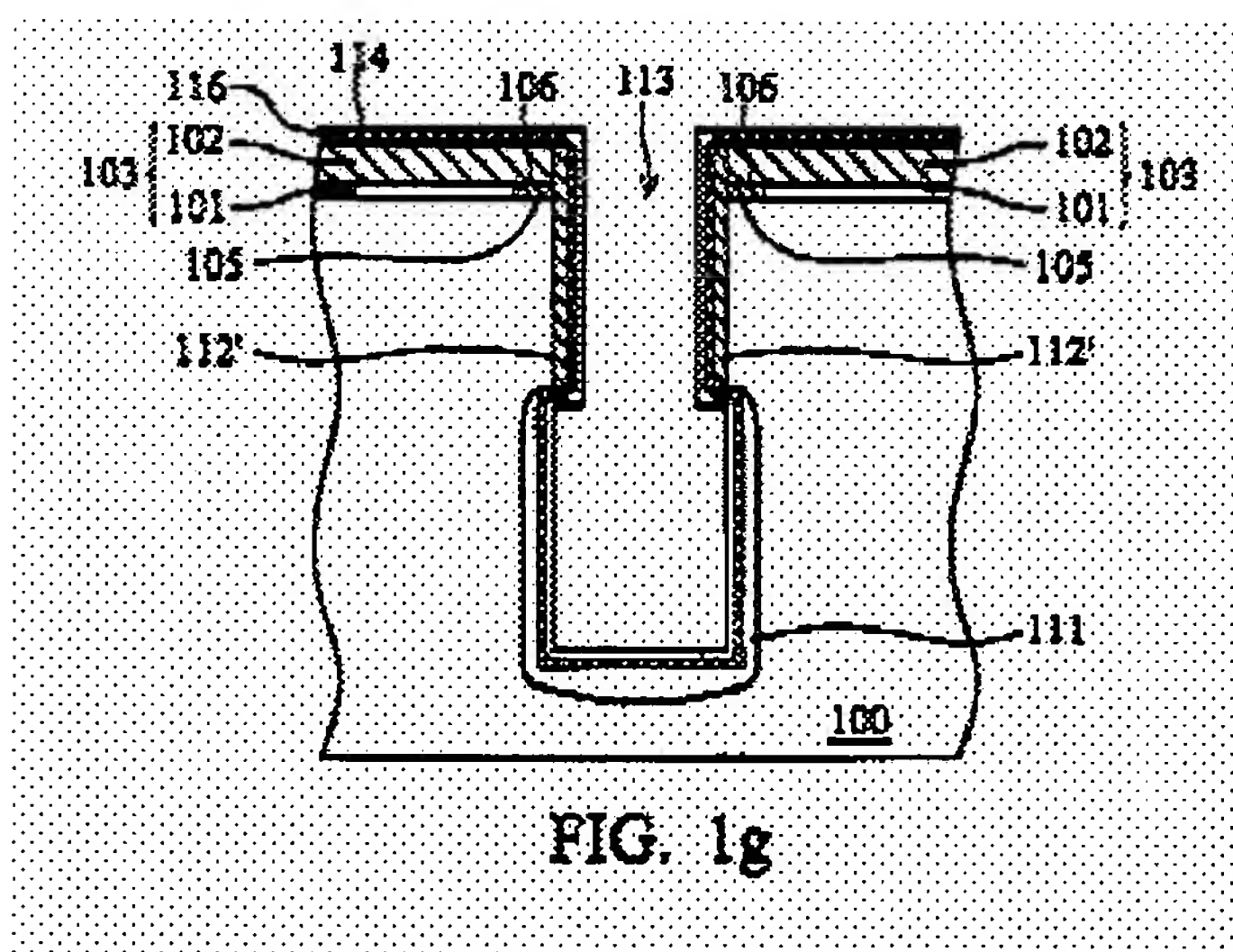


depositing a silicon nitride layer 112' on the inner wall of the deep trench 104 (col. 3, lines 66-67); performing a diffusing process for forming a doped region 111 at a bottom of the trench 104 (col. 4, lines 1-7 and FIG. 1g);

removing the silicon nitride layer 112' (col. 4, lines 8-14 and FIG. 1i); and  
 removing the doped silicate glass film (col. 4, lines 14-20 and FIG. 1i);



wherein the silicon nitride layer 112' serves as a barrier layer for preventing ions of the doped silicate glass film 108 from diffusing into a collar region of the deep trench 104 (col. 4, lines 1-7 and FIG. 1g).



In re claim 8, Chen discloses that the doped silicate glass film 108 is an arsenic silicate glass (ASG) film (col. 3, lines 45-46).

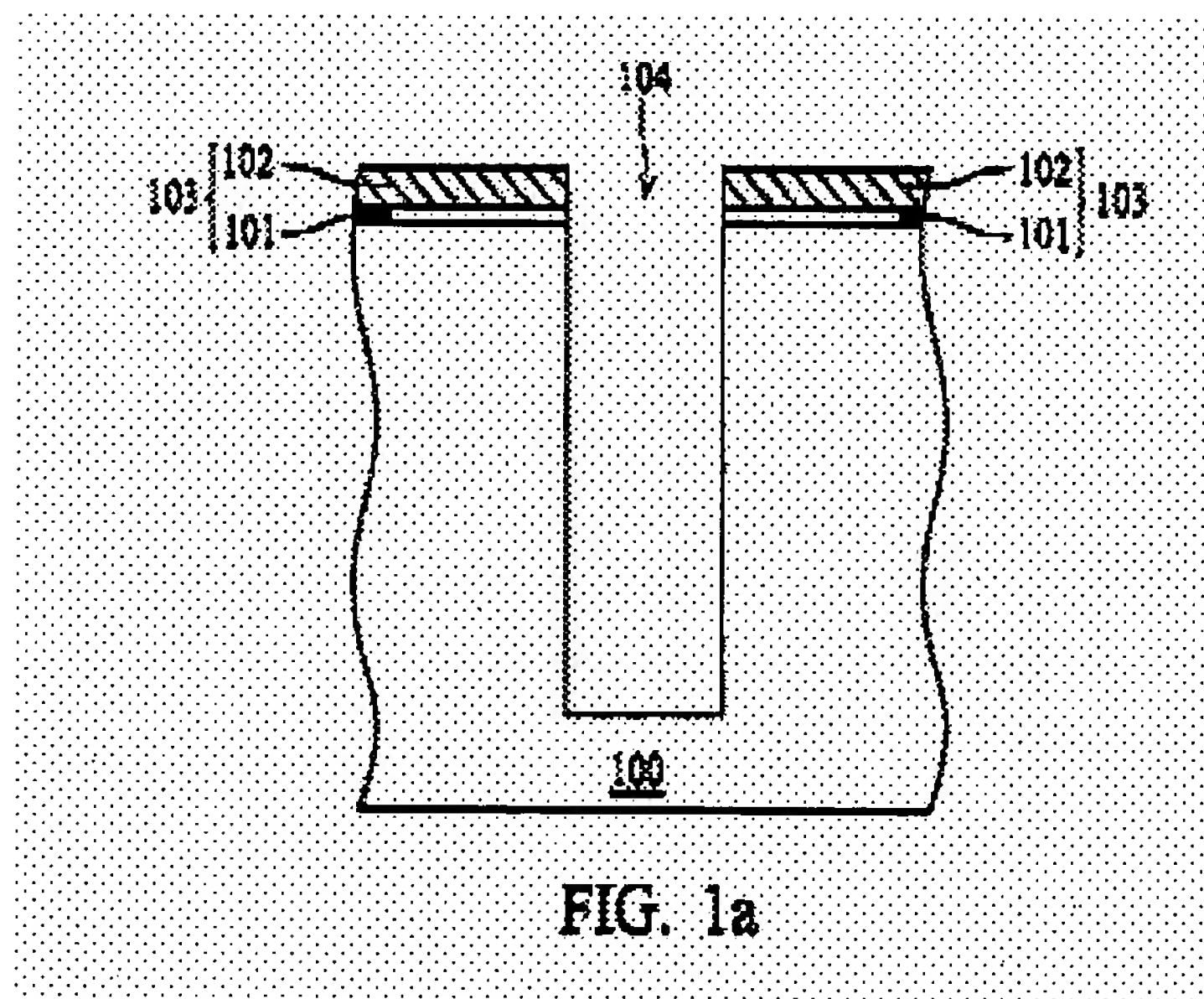
In re claim 9, Chen discloses that the arsenic silicate glass film 108 is formed by a chemical vapor deposition (CVD) process (col. 3, lines 42-44).

In re claim 10, Chen discloses that the silicon nitride layer 112' is formed by a chemical vapor deposition process (col. 3, lines 59-66).

In re claim 11, Chen discloses that the etching process is an anisotropic etching process (col. 4, lines 8-13).

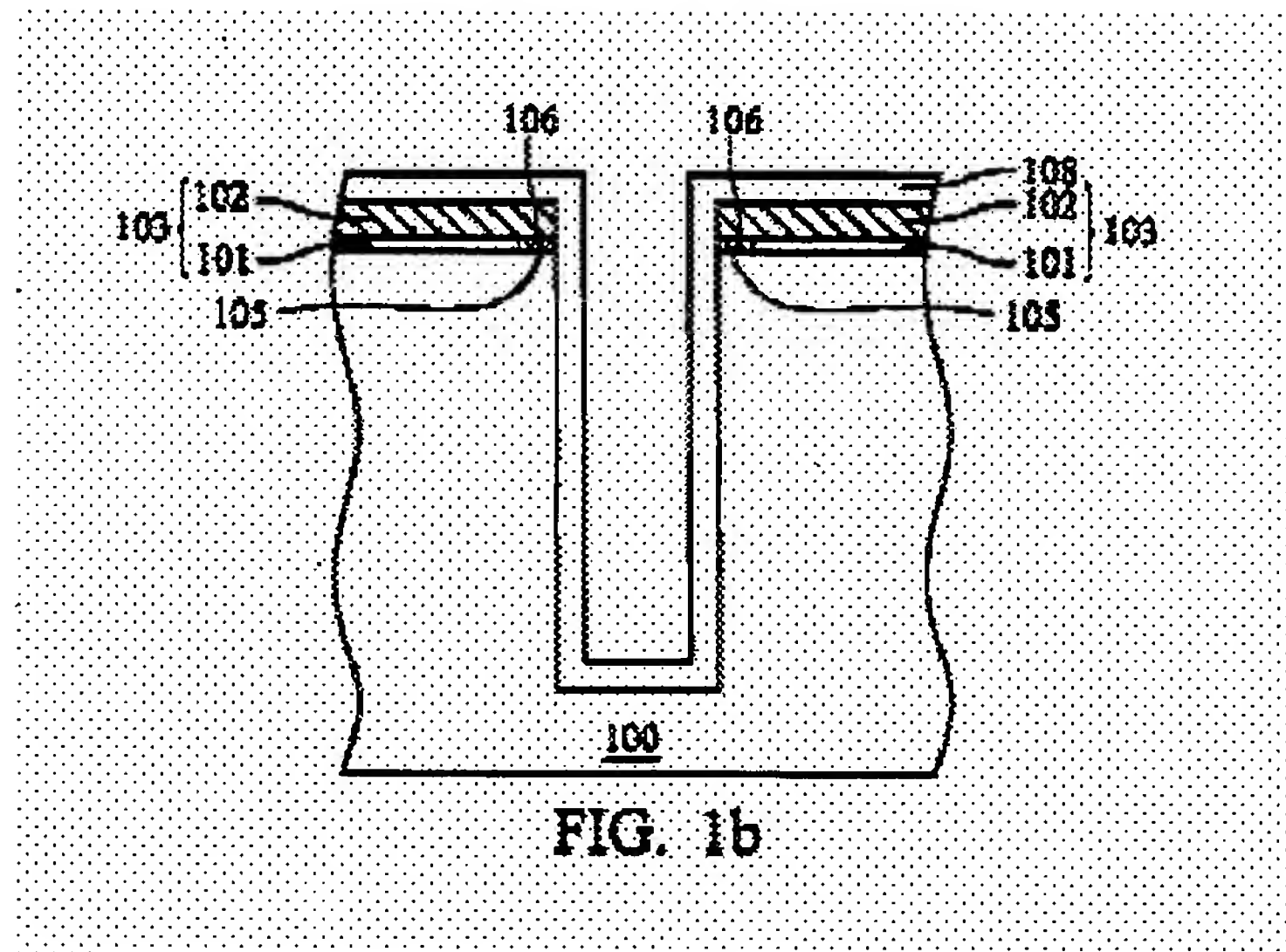
In re claim 12, Chen discloses that the silicon nitride layer 112' is removed by an anisotropic etching process (col. 4, lines 8-13).

In re claim 13, Chen discloses a method for forming a deep trench capacitor comprising: providing a substrate 100 having a pad oxide layer 101 and a pad nitride layer 102 thereon, the pad oxide layer 101 and a pad nitride layer 102 having at least an opening; performing a dry etching process for forming a deep trench 104 in the substrate via the opening (col. 3, lines 16-34 and FIG. 1a);

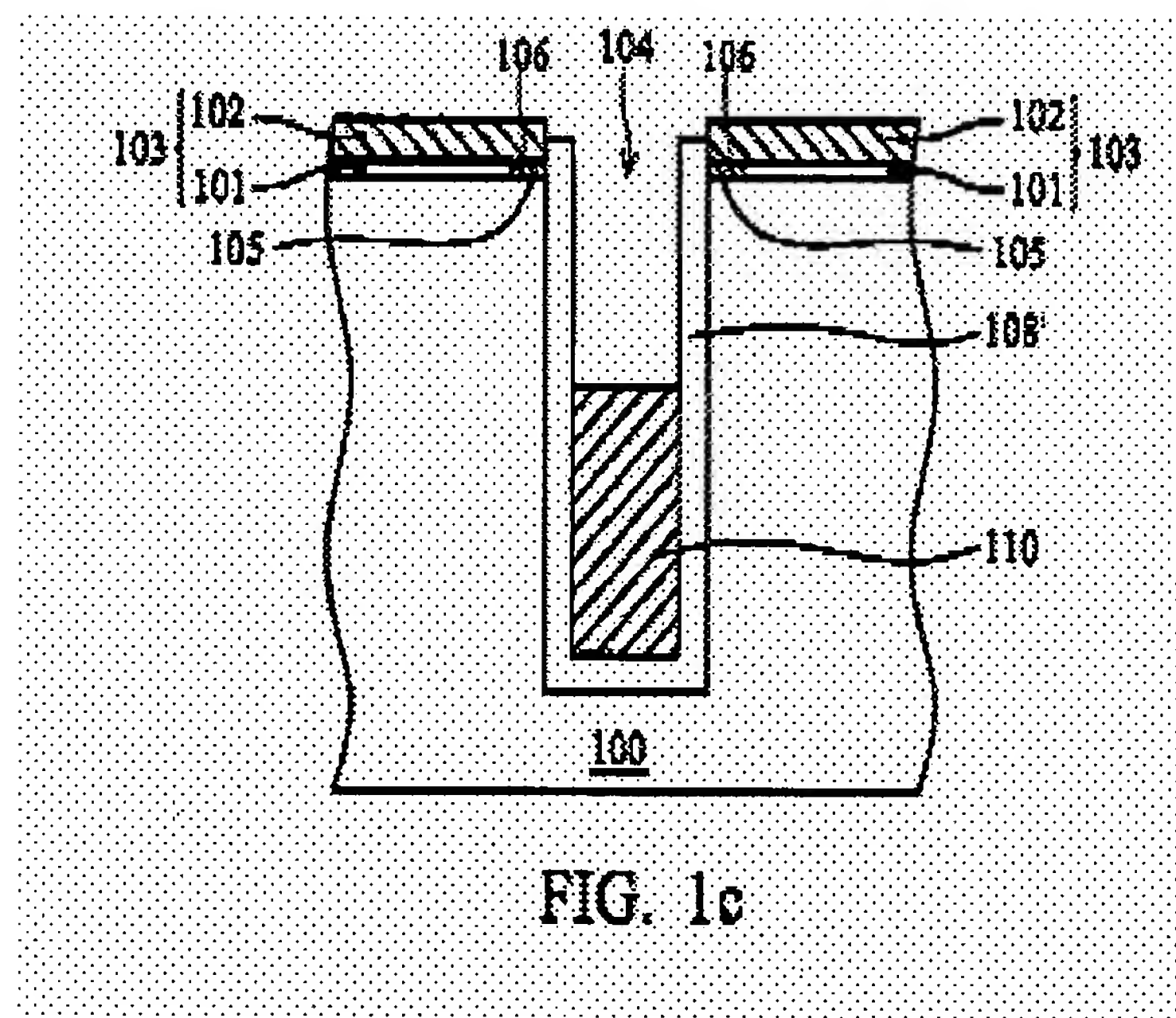


depositing a doped silicate glass film **108** on an inner wall of the deep trench 100

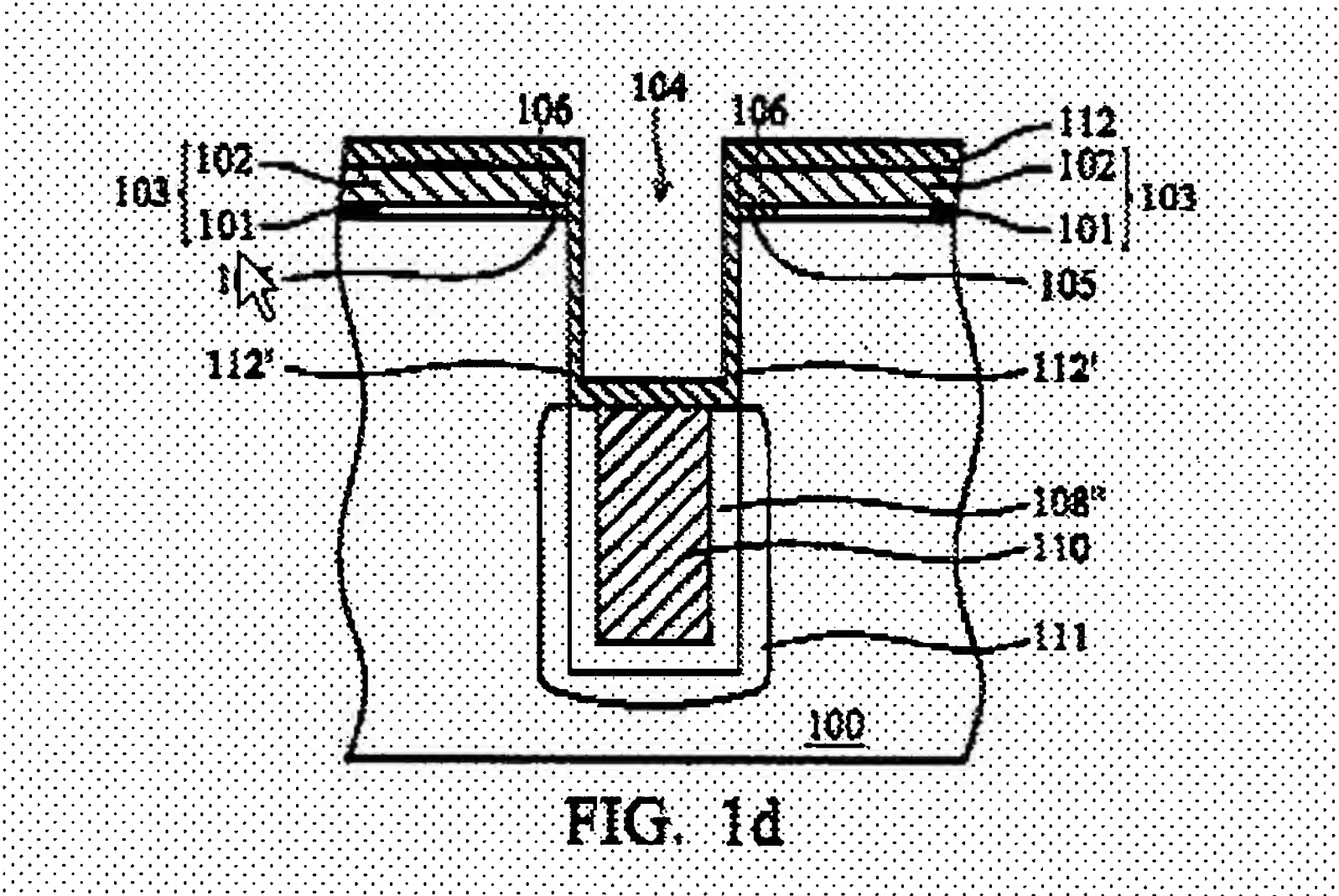
(col. 3, lines 35-47 and FIG. 1b);



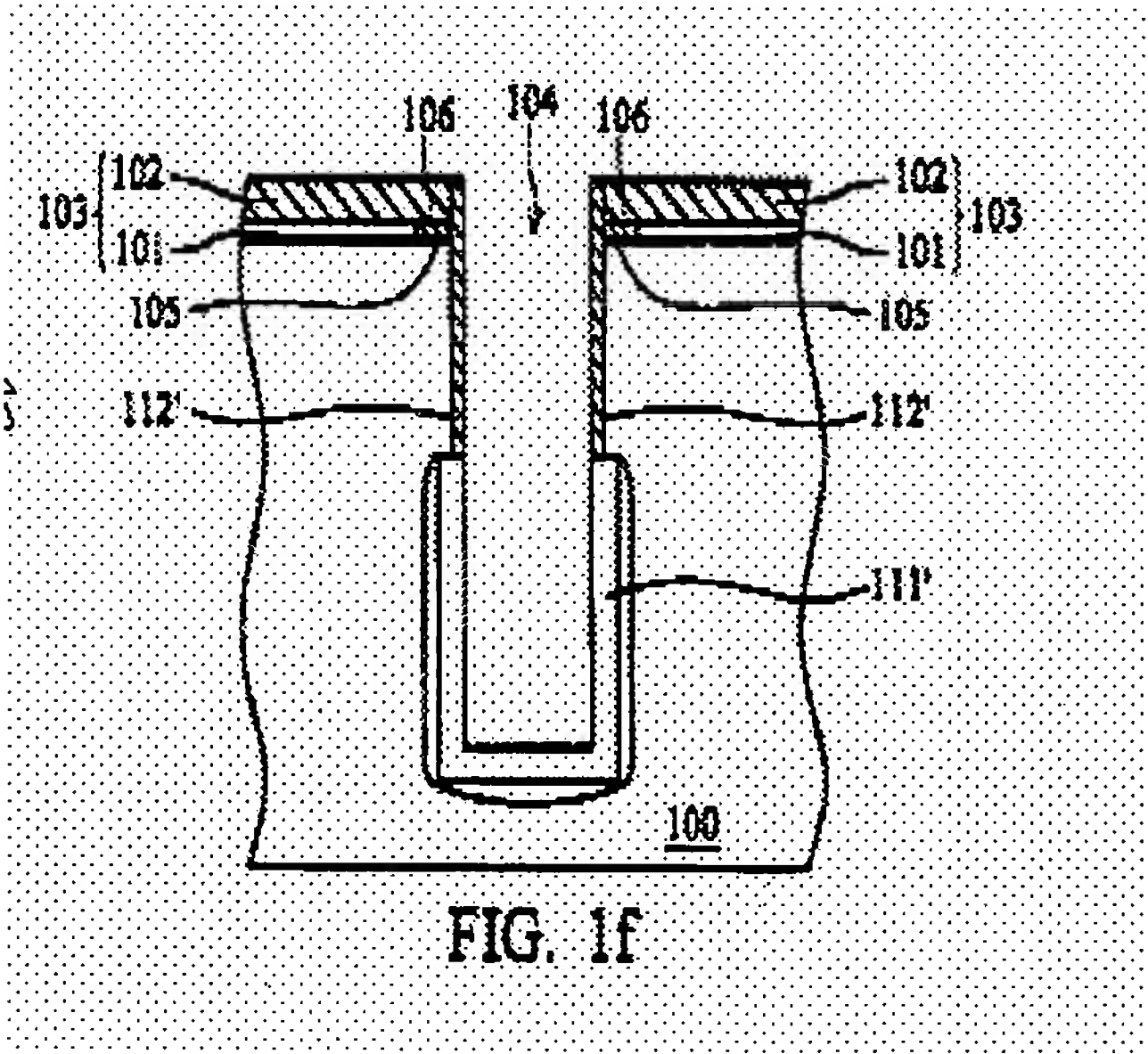
filling a sacrificial layer into the deep trench 104 (col. 3, lines 48-58); etching back the sacrificial for exposing parts of the doped silicate glass film 108 (col. 3, lines 48-58 and FIG. 1c);



removing the exposed doped silicate glass film 108 (col. 3, lines 59-66 and FIG. 1d);

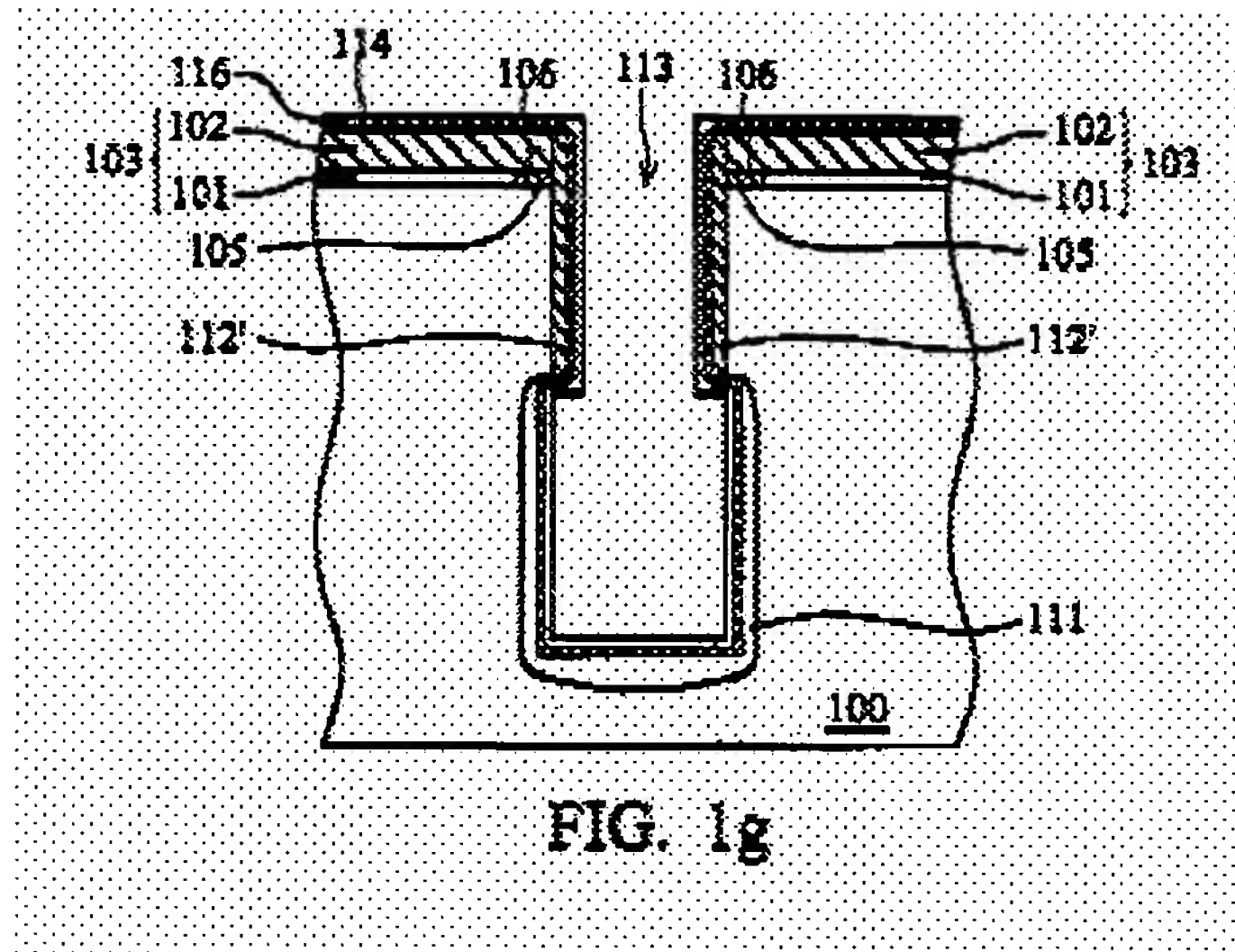


removing the remaining sacrificial layer (FIG. 1f);

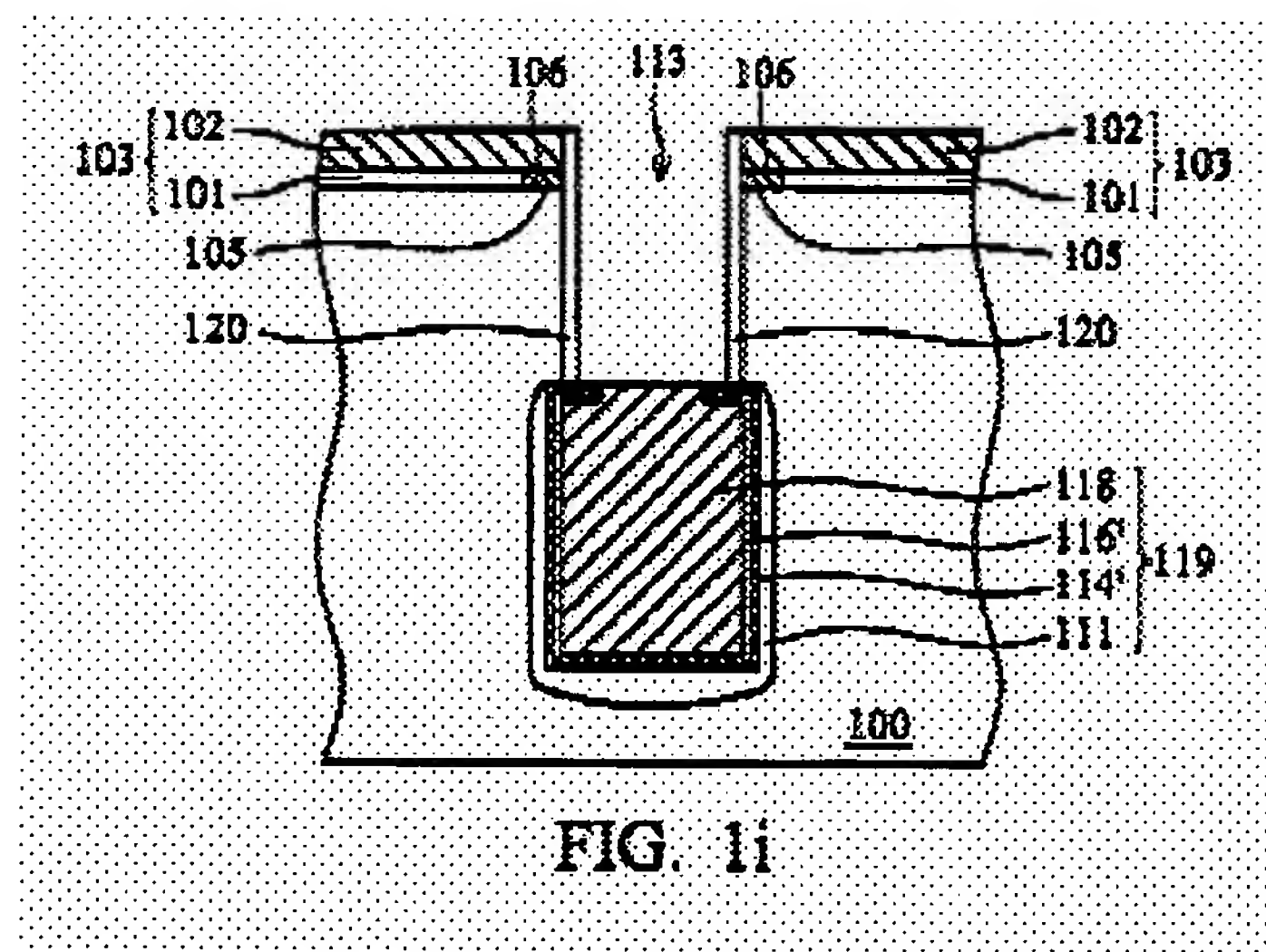


depositing a silicon nitride layer 112' on the inner wall of the deep trench 104 (col. 3, lines 66-67) after removing the remaining sacrificial layer; performing a thermal

process for forming a doped region 111 at a bottom of the trench 104 (col. 4, lines 1-7 and FIG. 1g);



removing the silicon nitride layer 112'; and removing the doped silicate glass film 108 (col. 4, lines 14-20 and FIG. 1i).



In re claim 14, **Chen** discloses that the doped silicate glass film **108** is an arsenic silicate glass (ASG) film (col. 3, lines 45-46).

In re claim 15, Chen discloses that the arsenic silicate glass film is formed by a chemical vapor deposition (CVD) process (col. 3, lines 42-44).

In re claim 16, Chen discloses that the silicon nitride layer is formed by a chemical vapor deposition process (col. 3, lines 59-66).

In re claim 17, Chen discloses that the doped silicate glass film 108 is removed by an anisotropic etching process (col. 4, lines 8-13).

In re claim 18, Chen discloses that the silicon nitride layer 112' is removed by an anisotropic etching process (col. 4, lines 8-13).

In re claim 19, Chen discloses that the silicon nitride layer 112' serves as a barrier layer for preventing ions of the doped silicate glass film 108 from diffusing into a collar region of the deep trench 104 (col. 4, lines 1-7 and FIG. 1g).

### ***Conclusion***

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Khiem D. Nguyen whose telephone number is (571) 272-1865. The examiner can normally be reached on Monday-Friday (8:30 AM - 5:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew S. Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2823

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

K.N.

October 19, 2006

A handwritten signature in black ink, consisting of a large, loopy 'C' followed by a series of connected loops and a final downward stroke.

**W. DAVID COLEMAN**  
**PRIMARY EXAMINER**